

Astrid Boje | Curriculum Vitae

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Graduate chemical engineer with a dual masters in mathematics and scientific computing. Currently a PhD student in the Computational Modelling group at the University of Cambridge, working with stochastic methods for solving population balance equations.

Work experience

- **Helmholtz Zentrum Dresden Rossendorf** **Dresden, Germany**
Intern in Experimental Thermal Fluid Dynamics *June, 2014 – August, 2014*
3 month summer internship. Worked on a 1D, dynamic, multicomponent, compartment model for a slurry bubble column reactor for Fischer-Tropsch synthesis.
- **Mintek** **Johannesburg, South Africa**
Graduate Engineer in Measurement and Control *January, 2013 – July, 2013*
6 month employment between South African undergraduate graduation and start of European Master's program. Worked in the Measurement and Control division. Researched the viability of thickener control and helped document models developed for the in-house control framework (written in C++). Contributed to on-site testing of a flotation reagent controller.
- **Mintek** **Johannesburg, South Africa**
Engineering intern in Measurement and Control *December, 2011–January, 2012*
8 weeks of vacation work and training as a compulsory component of a Bachelor's degree in Chemical Engineering and due requirements as a bursary student of the company. Developed a temperature-dependent amperometry model to be incorporated into an existing cyanide measurement technology.

Teaching experience

- **University of Cambridge** **Cambridge, United Kingdom**
Supervisor for Partial Differential Equations Course *January, 2019 – April, 2019*
Supervised (small-group teaching) students for the duration of this course, which is in Part IIA of the Chemical Engineering Tripos.

Education

Academic Qualifications.....

- **Churchill College, University of Cambridge** **United Kingdom**
Ph.D. Chemical Engineering *2015–Current*
Detailed population balance modelling of titania synthesis in an industrial reactor. My thesis involves using a Monte Carlo method to solve population balance equations to study combustion synthesis of inorganic nanoparticles. The in-house code we use is written in C++. I am currently working on numerical algorithms to improve performance of the stochastic solver under the industrial conditions. The project is funded by Venator and Cambridge CARES. Thesis advisors: Prof. Dr. Markus KRAFT. I am funded by Venator and Cambridge CARES.

- **Technical University of Berlin (TUB)**

M.Sc. Scientific Computing, 1.2, "Sehr Gut"

Coursework included control theory, differential algebraic equations, optimal control of partial differential equations and model order reduction. Thesis was done at the Weierstrass Institute of Applied Analysis and Stochastics (WIAS): *Convergence of stochastic coagulating particle systems*. Thesis advisors: Dr. Robert PATTERSON (WIAS) and Prof. Dr. Wolfgang KÖNIG (TUB, WIAS). I was funded by an Erasmus Mundus scholarship.

Germany

2014–2015
- **Royal Institute of Technology (KTH)**

M.Sc. Mathematics, A, "Excellent"

Coursework included stochastic differential equations, parallel and high-performance computing, fast numerical algorithms, mathematical modelling, finite element and finite volume methods, non-linear optimisation. I was funded by an Erasmus Mundus scholarship.

Sweden

2013–2014
- **University of Cape Town (UCT)**

B.Sc. Eng. Hons. (Chemical Engineering), First Class

Coursework in mathematics, physics, chemistry, thermodynamics, numerical methods, process design, modelling and control. I also took a post-graduate level course in optimisation. Honours project in modelling of Fischer Tropsch synthesis. Advisor: Prof. Dr. Klaus MÖLLER. I was funded by a faculty entrance scholarship and a bursary from Mintek.

South Africa

2009–2012

Technical and Personal skills

- **Programming Languages:** MATLAB/SCILAB, PYTHON, and C++. Basic proficiency with MPI/OpenMP and parallel programming.
- **Commercial software:** ASPEN HYSYS, COMSOL MULTIPHYSICS.
- **Opensource software:** WALBERLA (Widely Applicable Lattice-Boltzmann from Erlangen).
- **General:** Linux, Microsoft Windows, L^AT_EX, OpenOffice, Git.

Interests and extra-curricular activity

- Member of the **Cambridge University Ballet Club** (2015–2016, 2018–2019). Performed in the 2019 performance of Don Quixote.
- Member of the **Churchill College Boat Club** (2015–2016, 2018–2019). Rowed in the women's second boat in Michaelmas, Lent and May terms of 2015–2016. Sub for women's first and second boats Michaelmas and Lent of 2018–2019 due to time constraints.

Achievements

- **Cambridge University Ph.D. Studentships**

Cambridge Centre for Advanced Research and Education in Singapore (CARES)
Chemical Engineering and Biotechnology Department

2016–2019
- **COSSE Double Masters Programme**

Erasmus Mundus Scholarship

2013–2015
- **Mintek**

Undergraduate Bursary

2011–2012

- **University of Cape Town, Faculty of Engineering** 2010–2012
Dean's Merit List
- **University of Cape Town, Faculty of Engineering** 2009
Entrance Scholarship
- **Independent Examinations Board (IEB), South Africa** 2008
Top 40 IEB Matriculants
- **Our Lady of Fatima Convent School, South Africa** 2008
Matric DUX Student and subject trophies: English, Afrikaans, Bilingualism, Physics, Biology, Mathematics and Physics, History, Life Orientation
- **Kwa-Zulu Natal Youth Dance Company, South Africa** 2006–2008
Performed with KZN Youth Ballet Company.

Publications

- BOJE, A., AKROYD, J., KRAFT, M., 2018. A hybrid particle-number and particle model for efficient solution of population balance equations. Submitted for publication.
- BOJE, A., AKROYD, J., SUTCLIFFE, S., EDWARDS, J., KRAFT, M., 2017. Detailed population balance modelling of TiO₂ synthesis in an industrial reactor. Chemical Engineering Science 164, 219–231. doi: 10.1016/j.ces.2017.02.019.

Conference talks

- BOJE, A., AKROYD, J., KRAFT, M., 2018. Numerical study of the evolution of particle size and morphology in an industrial titanium dioxide reactor. American Institute of Chemical Engineers (AIChE) Annual Meeting.

Conference posters

- BOJE, A., KRAFT, M., 2017. Computational study of temperature effects in TiO₂ synthesis in an industrial reactor. Cambridge Particle Meeting.